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Prevention of Hazardous Tree Defects – By Gary R. Johnson, Richard J. Hauer, and Jill D. Pokorny

(The following is an adaptation of the first half of an article by the authors cited above – an adaptation of part two of this article will be presented in a later edition of the Citizen Forester)

Introduction

The fundamental goal of tree risk management is to prevent development of hazardous tree defects and reduce the risks hazardous trees pose to public safety. Development of many hazardous defects in trees can be prevented through effective planning, and the implementation of sound arboricultural practices. Post-storm tree damage surveys document that appropriate species composition, and proper planting and maintenance practices can help prevent the formation of many structural defects that predispose trees to branch and stem failures.(Dempsey 1994, Johnson 1999). This chapter discusses how communities can prevent development of many hazardous tree defects through effective streetscape planning and design. Designing a species-diverse, uneven – aged forest, matching tree species to site conditions, purchasing high quality nursery stock, implementing proper planting and pruning techniques, and protecting trees from construction damage help to promote healthy trees and reduce development of hazardous tree defects.

Designing a Species – Diverse, Uneven – Aged Urban Forest

When many of our older cities were established, there were initially few large trees present. Tree planting programs lined the streets of many communities with avenues of even – aged trees all of the same species. While these planting programs eventually resulted in aesthetically beautiful tree-lined boulevards, this practice led to problems that eventually convinced arborists that this practice should be avoided. The vulnerability of an urban forest to insect and disease outbreaks is much higher where a single species of tree dominates the landscape. This problem was dramatically illustrated during the Dutch Elm disease epidemic that altered forever the character of so many eastern city streets.

As many of the avenue trees planted in the early 20th century are rapidly approaching the end of their normal lifespan in an urban setting, urban forest managers have an opportunity to develop a well-designed, species-diverse, uneven-aged management system……. Even in those communities where trees are somewhat haphazardly replanted

as they die, the results will be an unavoidable shift from an even-aged management system towards a more sustainable species-diverse, uneven-aged management system.

Matching Tree Species to Site Conditions

Tree species vary in their nutritional, water, and light requirements, and in their resistance to environmental and chemical extremes. **Match tree species to each site by considering both the silvical characteristics (requirements) of the tree, and the conditions of the site.** The Silvics Manual of North America, volumes 1 (conifers) and 2 (hardwoods) are excellent sources of information on plant/site requirements (Burns and Honkala 1990).

Site Characteristics that Affect Tree Species Selection

When choosing a species to fit a site, consider soil and light conditions; exposure to sun, wind, ice, snow, and de-icing salt; space limitations (both above and below ground) and human use of the site. Soil conditions, especially in urban areas, often drive species selection. In addition to the site factors listed above, trees in areas that are converted from woodland to urban use through new construction require specific consideration. (Site characteristics to be considered in species selection are listed and described in full in the complete article – including recommended management strategies for each characteristic; for purposes of saving space, they are listed here briefly).

1. Soil pH
2. Soil Compaction
3. Soil Drainage
4. Low Light Situations
5. Exposure to Sun and Wind
6. Susceptibility to Ice, Snow, and Wind Damage
7. De-icing Salt Damage
8. Human Use of the Area
9. Space Limitations

Urbanization of Woodlands

Forest trees that have been in relatively protected and undisturbed environments for all of their lives become very vulnerable to exposure when these forests are urbanized, that is, when residential or commercial subdivisions are built in or around the forests. Suddenly, the trees that were once protected from wind and sun are exposed, in particular those that have now become residents of the forest edge. Typically, these trees are tall and slender, with very high canopies and very shallow root systems, and are more prone to windthrow.

Roots of the new edge trees are commonly lost during development of wooded areas, either directly through cutting, or indirectly through exposure, loss of soil moisture, and subsequent death of the shallow network of supportive, fine roots. As a result, they become less stable and more vulnerable to winds and windthrow. In addition, they produce more dead wood in the canopies as a result of defensive dieback in reaction to

the root loss and death. So even if they are able to remain vertical despite the increasing wind loads, they often produce a significant amount of deadwood high in the canopies that presents a threat to people and structures below.

A few simple steps can help to alleviate the stresses that exposure of these trees causes:

1. Protect the roots of trees during construction – with physical barriers and written policies
2. Cover the soil under newly exposed trees with organic mulch
3. Irrigate trees during and after construction activities
4. Under-plant the newly exposed soil areas under trees with shrubs and small trees to reduce the amount of sunlight and drying wind that reach the forest floor.
5. Do not "clean up" the forest floor by removing natural leaf litter and other detritus that serves to protect the soils of the remaining tree covered area.

Purchasing High Quality Nursery Stock

Just as it is important to select the right trees for the right places, it is equally as important that the trees selected for planting are of high quality. Planting unthrifty planting stock is money wasted, and sets the stage for future tree health problems and unsuccessful streetscape designs. Communities that invest in high quality trees and proper planting and maintenance practices will enjoy the benefits of a tree resource that increases in aesthetic and economic value, possesses fewer hazardous defects, and lives longer.

Industry standards for nursery stock have been established by the American Association of Nurserymen and are published in the American Standard for Nursery Stock, ANSI Z60.1 (ANSI 1996).

Here are some tree quality characteristics that communities should look for when purchasing nursery stock for tree planting operations:

1. Single, straight trunk that is free of branches below 6 to 8 feet (for trees to be planted within a few feet of a sidewalk or street)
2. A strong form with well spaced, firmly attached branches
3. A trunk free of stem defects such as mechanical wounds, flush cut pruning wounds, cankers, insect injuries, or cracks.
4. Adequate root ball/container/root spread size in relation to tree caliper (see American Standard for Nursery Stock, ANSI Z60.1).

Consider rejecting trees with the following problems:

1. Trees with double or multiple leaders
2. Trees with weak branch unions (e.g. narrow, V-shaped) and included bark in branch unions
3. Trees with defects on the main stem – (wounds, cankers, insect damage, cracks)
4. Trees with serious root related problems – (girdling roots, crushed/damaged roots)

Conclusion

By taking steps to design a species-diverse, uneven – aged forest, match tree species to site conditions, and purchase high quality nursery stock, community foresters can reduce the incidence of tree hazards and the costs associated with mitigation of those hazards. As the old saying so correctly admonishes, "an ounce of prevention is worth a pound of cure." In part two of this series about preventing tree hazards, we will look at implementing proper planting and pruning techniques, and protecting trees from construction damage.

Picks and Shovels

Read the full article by Gary R. Johnson, Richard J. Hauer, and Jill D. Pokorny at Chapter 4 of :
http://www.na.fs.fed.us/spfo/pubs/uf/utrmm/

***Urban Tree Risk Management: A Community Guide to Program Design and Implementation* full document found at:**
http://www.na.fs.fed.us/spfo/pubs/uf/utrmm/
(note: this document also available in hard copy from Eric Seaborn at eric.seaborn@state.ma.us)

Silvics of North America found at:
http://www.na.fs.fed.us/pubs/silvics_manual/table_of_contents.shtm

Right Tree in the Right Place DCR Fact Sheet at:
http://www.mass.gov/dcr/stewardship/forestry/urban/treeSelect.pdf

ANSI Z60.1 American Standard for Nursery Stock at:
www.anla.org/applications/Documents/Docs/ANLAStandard2004.pdf

Growing Greener

Town of Orleans – Orleans is perhaps a typical small Massachusetts town in terms of its size (population 6341) and municipal resources for forestry – Tree Warden Dan Connolly is the Tree and Forest Department. However, under Dan's leadership, the town is pursuing an aggressive policy to manage its public forest resources. Orleans has achieved all six of the criteria that the DCR uses to evaluate strong program performance; 1) an active management plan based upon an inventory, 2) qualified, professional staff – Dan is an Mass Certified Arborist, 3) active enforcement of Chapter 87, 4) an active advocacy group in the Orleans Improvement Association, 5) Tree City USA status and 6) good inter-agency communication within the municipal government relative to tree related decisions. Building upon these successes, Dan submitted and was awarded a

grant from the DCR to update the town's inventory. This new data will be loaded in to the Mass Tree Count state wide inventory system that DCR and Davey Tree have made available over the web. Dan and the Town of Orleans have taken a proactive approach to managing the community's forest resources. This approach not only bodes well for the future of the community forest resource, but also serves as an example of what can be done in small communities when dedicated public managers take a leadership role.

Growing on Trees

Congratulations "Outstanding Citizen Foresters" and Tree Stewards:
This past weekend, we honored Margie Baldwin, Sherri Brokopp, Richard Gale and Ken Gooch at the annual Massachusetts Tree Steward Training as Outstanding Citizen Foresters for their service and dedication to urban and community forestry in the Commonwealth. Congratulations Margie, Sherri, Richard and Ken! Press releases with full descriptions of the winners services are available upon request by contacting Eric Seaborn at 617-626-1468 or eric.seaborn@state.ma.us

Also during the two-day training, 25 committed citizens and public officials received training in urban and community forestry issues, in order to help them become better stewards of the forests of their communities. Congratulations and thanks to all for making this training a success each year.

National Grid Grants: if you reside in the communities of **Douglas, Hawley, Heath, Uxbridge, Billerica, Rowe, Charlemont, Topsfield, Wenham, Norwell, Andover, Hanson, Pembroke, Wilbraham, Pepperell, Lancaster, or Haverhill** your community is eligible to access funds through the DCR – National Grid Partnership Challenge Grants funds. For more information, please visit the DCR National Grid Partnership grant section of our web site at:
http://www.mass.gov/dcr/stewardship/forestry/urban/urbanGrants.htm

Community Inventory Guide available: Using grant funds from the DCR, the University of Massachusetts in cooperation with the City of Springfield and the USDA Forest Service has developed a booklet entitled *Community Guide: Urban and Community Forestry Inventories*. This useful guide leads communities through the steps necessary to complete a community forest inventory, covering issues including urban forestry management tools, inventory types, how to complete the inventory and many more. If you would like copies for your community or group, please contact Eric Seaborn at 617-626-1468 or eric.seaborn@state.ma.us

On The Horizon

Tree City USA – It's Never Too Early to Start – A friendly reminder that Tree City USA applications and re-certification documents are due by December 31, 2006. If your community has not participated in this program in the past but you would like to try for this year, or if you are a veteran in the program, please visit the Tree City USA portion of our site http://www.mass.gov/dcr/stewardship/forestry/urban/urbanFAQs.htm#treeCity

We are pushing toward our goal of 100 Tree Cities in the next few years and we are ready to help you attain this valuable public relations recognition award. Please contact Jane Calvin, Alan Snow or Eric Seaborn for details and assistance (contact information at the end of this newsletter).

Funding Available For Habitat Management on Private Lands
Individual landowners, land trusts, sportsmen's clubs, farmland owners and other conservation organizations are eligible to apply for available wildlife habitat management funding through MassWildlife's Landowner Incentive Program (LIP). The application period will open on Monday, October 30 and will be posted on the State's Comm-Pass website at www.comm-pass.com. The deadline for receiving applications for LIP is 5 pm Friday, December 22, 2006. Details about the Landowner Incentive Program may be found on MassWildlife's website at: http://www.mass.gov/dfwele/dfw/dfw_lip.htm

Projects which focus on maintaining grasslands and creating areas of young tree and shrub growth (early woodlands) to enhance wildlife habitat will receive priority. Some of the important ranking criteria for applications to LIP include; type of habitat, number of at-risk species affected; proximity to BioMap Core Habitat; and percentage of "match" the landowner is willing to commit to the project. Private landowners such as land trusts, non-profit groups and individuals are eligible to apply for this funding. Federal, State and municipal lands are not eligible, but may qualify for other MassWildlife habitat management programs.

Request for Proposals - Wildlife Action Opportunities Fund
The Wildlife Conservation Society is pleased to announce a Request for Proposals (RFP) for grants under its newly created Wildlife Action Opportunities Fund. Made possible through the generosity of the Doris Duke Charitable Foundation, the Wildlife Action Opportunities Fund will distribute $2 million over the next two years to support 501 (c)(3) nonprofit organizations working to implement State Wildlife Action Plans in any of the 50 states or six U.S. territories. A second RFP for year two of the program will be announced in 2007. All questions regarding this program or the RFP process should be directed to Wildlife Conservation Society Grants Program Officer Darren Long (dlong@wcs.org) at 406-522-9333 x103 or Craig Groves (cgroves@wcs.org) at 406-522-9333 x109.

Empire State Green Industry Show November 14-16, 2006, Rochester Riverside Convention Center, Rochester, NY. This is a combined education conference and trade show of the New York State Arborists, ISA Chapter Inc.; New York State Turfgrass Association; New York State Nursery/Landscape Association; and New York State Flower Industries. For details, contact Jill Cyr at 518-783-1229, 800-873-8873, jill@nysta.org, or www.nysta.org.

Massachusetts Tree Wardens and Foresters Association (MTWFA) 94th Annual Conference – January 10 – 11, 2007 Host Hotel and Conference Center, Sturbridge, MA. The MTWFA is now accepting applications to exhibit at the conference in January. Please visit the MTWFA web site at www.masstreewardens.org Exhibitor reservations

can be made by contacting info@masstreewardens.org or contact Karen Doherty at 413-315-3454.

Species Spotlight

***Zelkova serrata*, Japanese Zelkova**

General Description:
Zelkova is a medium sized tree (50' to 70" at maturity) whose characteristic vase shape when young has made it a popular alternative to American Elm which also grows with this shape. Mature trees tend to develop full, round crowns. The bark of Zelkova stands out with its deep bronze color and prominent lenticels (see photo below) reminiscent of some cherries. The leaves of Zelkova are alternately arranged and simple and are noted for their serrated margin – thus the serrata in the Latin name. Fall foliage is variable, showing colors from yellow to russet to deep red and even purple.

Advantages and Limitations:
Zelkova has proven to be relatively easy to transplant and establish and has shown good resistance to diseases and insects. Zelkova is also relatively tolerant of drought and pollution, making it a good planting candidate for urban areas. Zelkova is susceptible to infestation by Japanese Beetle and although it has shown good resistance to Dutch elm Disease and bacterial canker, it is not immune to these diseases. Zelkova can also be limited by its cold hardiness to zone 5, but cultivars with greater hardiness, such as "Village Green" are available.

Right Tree in the Right Place:.
As noted above, Zelkova has proven itself to be a good urban tree species that is relatively tolerant of pollution and drought and other urban stresses. This tree does require a fairly large space to grow in to so that it can express its full crown at maturity. As a medium sized tree capable of growing to 70', this tree should not be considered for plantings under power lines or other overhead obstructions.

For more information and detail on cultivars visit:
http://www.hort.uconn.edu/Plants/p/plaace/plaace1.html.

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If you have a topic or addition to the Citizen Forester newsletter, please let us know.

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